Twentieth Street Viaduct
Spanning the Platte River Valley on Highway I-25 and the South Platte River, between Thirty-third Avenue and Blake Street
Denver
Denver County
Colorado

HAER No. CO-51

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

Historic American Engineering Record
Rocky Mountain Regional Office
National Park Service
U.S. Department of the Interior
P.O. Box 25287
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HISTORIC AMERICAN ENGINEERING RECORD

Twentieth Street Viaduct

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Location: Spanning the Platte River Valley Railyards on Highway I-25 and the South Platte River between Thirty-third Avenue and Blake Street, Denver, Denver County, Colorado

UTM: A 13.499649.4401190
B 13.500530.4400290
Quad: Arvada, Colorado (West)
Commerce City, Colorado (East)

Date of Construction: 1909-1911

Designer: Colonel Herbert Samuel Crocker of Denver, Colorado

Builder: Milwaukee Bridge Company

Present Owner: Colorado Department of Highways

Present Use: Vehicular and pedestrian bridge, to be replaced hy a new vehicular and pedestrian bridge. Projected date of removal is August 1992.

Significance: The Twentieth Street Viaduct is the longest of Denver's viaducts. Its length grew from the need to cross not only the Platte River but also Denver's extensive railyards, thus to alleviate the problem of train-automobile and train-pedestrian accidents. Its 85 spans of varying lengths are supported by steel columns and concrete piers. Long spans, bridging the river and the tracks, are carried by Warren trusses; short spans are carried by plate girders at either side of the roadway.

Historian: Kathleen Hoeft
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I. HISTORY

Denver is divided east and west by the Platte River Valley. The valley was developed as an industrial area and as the main north-south corridor of the railways. It was subject to severe flooding. As a consequence of both factors, it became a priority in the development of the city to construct viaducts that cross over not only the river but the entire valley.

In the November 1909 issue of Denver Municipal Facts, an article state "One of Denver's most important assets in the way of public improvements is her bridges and viaducts, which aggregate in place a million and a half of dollars." In 1909, within the city limits, there were nineteen large bridges and six viaducts in operation or in the course of construction spanning Cherry Creek and the Platte River. The Twentieth Street Viaduct was under construction, with a construction budget of $525,000.[1]

The cost of the project, when complete, was $613,578. Of the total, all but $66,730 was borne by the four major railroads whose tracks it would span.[2] The railroads were the Burlington, the Union Pacific, the Colorado and Southern, and the Moffat Road.[3] Because of accidents involving trains in the valley, there had been pressure to build the viaduct, and it was thought the money should come from the railroads. A newspaper article in April 1909 wrote "There has been a great deal of yawping about credit for forcing the railroads involved to construct the viaduct. The Post modestly claims it helped to bring about the consummation....But every business man knows....The business men themselves did it by withdrawing all their traffic from the railroads involved and giving it to the Rock Island, which railroad was not concerned in the matter one way or the other.[4]

Another story gives credit for the railroads' funding of the viaduct to then-Denver Mayor Robert Speer. Slightly different versions of the story have been published, but they agree that it was Mayor Speer who forced the railroads to put up the money by introducing an ordinance in city council, requiring that watchmen be posted at the Twentieth Street crossings and that all trains stop to allow pedestrians and other traffic to cross. The ordinance would have hopelessly tied up rail traffic, and the railroad presidents succumbed to the pressure to pay for the erection of the viaduct.[5]

II. THE BRIDGE

A. Original Construction

Construction was begun on the viaduct in 1909. The Denver Post reported that "The Blodget Construction company has the contract of erecting the piers and building the foundations....The steel and bridge work will start immediately after the completion of the foundations, and will be undertaken by the Milwaukee Bridge company...."[6] The viaduct, the longest in Denver, was constructed 4,294 feet long with 85 spans of varying lengths supported by steel columns and occasional concrete piers.[7] The viaduct cleared many varying conditions below, requiring considerable variations in span lengths. Shorter spans, varying from 21 feet to 80 feet, are carried by plate girders at either side of the roadway. The longer spans bridging the river the tracks, varying from 98 feet to 166 feet, are carried by Warren trusses, also on either side of the roadway. These longitudinal girders and trusses support transverse plate girders which, in turn, support stringers typically 16 feet in length which carry the

roadway. The engineering is an example of an assemblage of small elements riveted together to create an efficient large structure.

The 34-foot-wide roadway was covered with five-inch-deep sub-base of creosoted yellow pine timbers and a surface covering of three-inch-deep creosoted pine blocks. Six-foot-wide reinforced concrete sidewalks were constructed at each side of the roadway. The structure was lighted by one hundred lamps on ornamental standards which were designed by Henry Read of the city's art commission.[8]

Although the viaduct was opened for traffic in 1911, the Delgany Street approach drawings were not completed until 1919. Colonel Herbert S. Crocker, chief civil engineer for the project, did one final viaduct drawing in 1925 for the widening of the south end approach.[9]

B. Modifications

Major reconstruction of the viaduct's deck slab was undertaken in 1957. This was the beginning of the removal of the creosoted wood deck and its replacement with a reinforced concrete deck. In 1969, the last three spans of this replacement, near the south end of the viaduct, were completed. The concrete deck was surfaced with asphalt.[10]

Between 1975 and 1978, in a series of projects, the decorative pedestrian railings of the viaduct were replaced with five-inch-diameter pipe railings. Only the approaches now retain original railings. Steel barriers between the roadway and the sidewalks were installed in the same period. New lights have been installed as well, but it is not known when the original decorative lights were removed.[11]

C. Existing Condition

The viaduct is in an advanced stage of deterioration. Penetration of water and salts used for winter de-icing has caused the damage, which involves severe oxidation and corrosion to steel supporting members.

Cracking on the underside of the deck, filled with effloresic residue, indicates complete penetration of the deck slab by the water and salts.[12]

III. THE ENGINEER

The viaduct was designed by Colonel Herbert Samuel Crocker of Denver.[13] Born in Haverhill, New Hampshire, in 1868, Col. Crocker graduated in engineering from the University of Michigan in 1889. After working in the offices of other engineers, he arrived in Denver in 1897. In addition to the Twentieth Street Viaduct, his obituary credits him with the design of many significant Denver projects, including the Fourteenth Street Viaduct, the Sixteenth Street Viaduct, the Colfax-Larimer Viaduct, and the West Alameda Subway.

During World War I, when he was promoted to the rank of colonel, his job was to supervise the erection of a $32 million army supply base in Brooklyn, New York. He considered this his greatest achievement.

Crocker was a member of the Denver Water Board and was its consulting engineer. He was in charge of trans-mountain water diversion, the Moffat water tunnel project, the Ralston Creek Dam, and the West Side Filter Plant.

He served as president of the American Society of Civil Engineers and as the supervising engineer of the Reconstruction Finance Corporation.

His son, Forrest Crocker, joined him in practice, and the name of the firm was changed to Crocker and Crocker. He died in 1949.[14]

IV. FOOTNOTES

1 "Denver has $1,500,000 Invested in Bridges and Viaducts," Denver Municipal Facts, November 27, 1909, pp. 3-4.

2 Thomas Noel. Denver: Rocky Mountain Gold. Tulsa: Continental Heritage Press, Inc., 1980, p. 105.

3 "Denver has $1,500,000 Invested...," Denver Municipal Facts, November 27, 1909, p. 4.

4 "Work on New Viaduct Begun this Morning," The Denver Post, April 9, 1909, p. 3.

5 Noel, p. 5; Lyle W. Dorsett, The Queen City: A History of Denver, Boulder, Colorado: Pruett Publishing Company, 1977, p. 139.

6 "Work on New Viaduct Begun....," p. 3.

7 Ed Maez, Denver Department of Public Works Memo, Denver Department of Public Works files, undated.

8 "New Viaduct Cost $575,000," Denver Municipal Facts, December 30, 1911, p. 13; H. S. Crocker, original drawings, Denver Department of Public Works.

9 Crocker drawings.

10 Maez.

11 File information, Denver Department of Public Works; Historic American Engineering Record Drawing 2 of 2, HAER No. CO-51.

12 Maez.

13 Crocker drawings.

14 Obituary, Rocky Mountain News, March 9, 1949, p. 14; Interview with Colonel Herbert Samuel Crocker, The Denver Post, June 21, 1947, p. 4.